

peculiarly substantial appearance, with entire reflexed margins, yet in the present preparation they could with difficulty be detected as mere ghosts of their normal shapes. The two discs rarely remained together, their characteristic entire margins were gone, the rotules being represented merely by a line of very fine rays. The speaker ventured no suggestion as to the influences or the method by which these changes had been effected, but referred the fact to the consideration of students more competent to deal with the mechanical and chemical constitution of these bodies.

Lieut. Thos. L. Casey, Eng. Corps, U. S. A., was elected a member.

JULY 1.

Mr. THOS. MEEHAN, Vice-President, in the chair.

Thirteen persons present.

A paper entitled "On a supposed new species of *Cristatella*," by Edw. Potts, was presented for publication.

Volcanic Dust from Krakatoa.—Prof. H. CARVILL LEWIS remarked that in connection with the cause of the beautiful red sunsets of last autumn and winter, which had been recently the subject of much discussion in the scientific periodicals, he had been interested in examining some volcanic dust which had been ejected from the volcano of Krakatoa, and which he had received through the kindness of Rev. Wayland Hoyt, D. D., of this city.

This dust, which, on August 27, 1883, fell thickly upon the decks, rigging and masts of the bark William H. Besse, bound from Batavia to Boston, is of a light gray color and harsh to the touch. It is essentially a pulverized pumice, by far the greater part of it consisting of fragments of volcanic glass. These fragments are sometimes twisted, but generally in flat angular transparent scales, which are filled with minute bubbles, and, of course, are isotropic. Angular fragments and crystals of transparent plagioclase, occasionally showing the hemitropic striations, and giving bright colors in the polariscope, together with more irregular and rounded fragments of dark green and brown pyroxenic minerals, probably augite and hypersthene, are scattered very occasionally among the glass particles. Grains of magnetite, often well rounded, also occur, and may be picked out and examined separately by a magnet covered with tissue-paper.

As it is this dust which is regarded as the cause of the universal red skies which followed so soon after the eruption, attempts have been made, both in Europe and America, to discover traces of it in snow or elsewhere,

In the suburbs of Philadelphia, some dust was collected by Mr. Joseph Wharton,¹ this winter, from melted snow, and from the presence in it of certain rounded and filamentous glass particles supposed by him to be volcanic. Some of it had been submitted by him to the speaker for examination. It appeared to be composed of particles of quartz, coal, cinders, vegetable matter, etc., among which are certain glassy hairs and rounded globules. These bear no resemblance to the angular glass fragments composing the Krakatoa dust, which is remarkably free from either filaments or globules; and the supposed volcanic glass particles in the Philadelphia dust are most probably of local origin—from blast-furnaces, foundries, or the like.

Accompanying the specimens of dust from Krakatoa, were extracts from the log of the bark, which present several points of interest. A point of special importance is the record of a sudden barometric fluctuation, due to a great atmospheric wave, which, starting from the volcano at the time of the eruption, has been shown to have "traveled no less than three and a quarter times round the whole circumference of the earth."²

Extracts from log of bark William H. Besse, from Batavia towards Boston.

"Aug. 26. This day commences with light airs and calms. Light airs throughout the day. At 5.30 P. M., wind hauling ahead, let go starboard anchor with thirty fathoms chain, clewed up and furled all sail. Adam light bore W. 1-4 S. and E. by S. Throughout the afternoon and night heard heavy reports, like the discharge of heavy artillery, sounding in the direction of Java Island. Very dark and cloudy throughout the night, with continual flashes of lightning. Barometer 30.15.

"Aug. 27. Commences with strong breezes, and thick, cloudy weather. Barometer 30.12. At 9.30 A. M., pilot left ship. Hove the lead every fifteen minutes. At daylight noticed a heavy bank to the westward which continued to rise; and, the sun becoming obscured, it commenced to grow dark. The barometer fell suddenly to 29.50, and suddenly rose to 30.60. Called all hands, furled everything securely, and let go the port anchor with all the chain in the locker. By this time the squall struck us with terrific force, and we let go starboard anchor with eighty fathoms chain. With the squall came a heavy shower of sand and ashes, and it had become by this time darker than the darkest night. *The barometer continued to rise and fall an inch at a time.* The wind was blowing a hurricane, but the water kept very smooth. A heavy rumbling, with reports like thunder, was heard continually; and the sky was lit up with fork lightning running in all directions, while a strong smell of sulphur pervaded the air,

¹ See his letter in *Public Ledger*, Jan. 22, 1884.

² *Nature*, vol. xxx, p. 12.

making it difficult to breathe. Altogether, it formed one of the wildest and most awful scenes imaginable.

The tide was setting strong to the westward throughout the gale, at the rate of ten knots per hour. At 3 P. M. the sky commenced to grow lighter, although the ashes continued to fall. The barometer rose to 30.30, and dropped gradually to 30.14, when it became stationary. The whole ship, rigging and masts, were covered with sand and ashes to the depth of several inches.

"Aug. 28. Commences with light airs and thick, smoky weather. Hove up starboard anchor, and hove short on port anchor. Dead calm throughout the day and night. Saw large quantities of trees and dead fishes floating by with the tide; the water having a whitish appearance, and covered with ashes. This day ends with a dead calm, and thick, smoky weather.

"Aug. 29. This day commences with calms, and thick, smoky weather. Made all sail throughout the day. Moderate winds, and thick, smoky weather. Passed large quantities of driftwood, cocoanuts, and dead fishes. At 8 P. M., passed Anjier, and could see no light in the lighthouse, and no signs of life on shore. Furled all light sails, and stood under easy sail throughout the night. Day ends with moderate winds and cloudy weather. Barometer 30.14.

"Aug. 30. Commences with moderate winds and cloudy weather. At daylight made all sail with a fresh breeze from the westward. Found the water for miles filled with large trees and driftwood, it being almost impossible to steer clear of them. Also passed large numbers of dead bodies and fish. Kept a sharp lookout on the fore-castle throughout the day. At 10 A. M., sighted Java Head lighthouse; but the wind hauling ahead, we kept away, and went round Prince Island. Latter part, fresh breezes and *thick, smoky weather*. Friday and Saturday, passed large quantities of ashes in the water. Saturday, crew employed in cleaning ashes off masts and rigging. Water had a green color."

JULY 8.

Mr. THOMAS MEEHAN, Vice-President, in the chair.

Eleven persons present.

A paper entitled "Catalogue of Sponges collected by Mr. Jos. Willcox on the West Coast of Florida," by Henry J. Carter, was presented for publication.

The following were ordered to be printed:—